

can be produced for 100 rupees, and he hopes that by engaging, not one chemist, but a dozen, the "cost of making indigo will soon be reduced to a level at which it will be quite impossible for synthetic to compete." Mr. Harington says, however, that the Behar planters cannot afford to spend more on experiments than they are now doing, and he appeals to the Indian Government to give a grant of at least 5000*l.* for five years. It is certainly refreshing when an indigo planter calls, not for one experienced chemist, but for a dozen. It is, unfortunately, more usual for manufacturers to sneer at chemists, saying that they only waste material in experimenting. Do they imagine that experiments which are carried out by chemists on the Continent and in America, and which enable these countries to undersell us, cost nothing?

If our manufacturers employed capable chemists and gave them a free hand, instead of employing what one may perhaps be allowed to term *glorified bottle washers*, there is very little doubt but that they would find experimenting does pay.

If it is true that, owing to bad seasons in India, the indigo producers cannot afford to pay for expert advice, then, owing to the enormous interests which are involved and the danger of delay, surely the Indian Government will not refuse its aid. It must, however, be remembered that Government cannot aid every industry.

It has already been stated in a previous article that Sir William Hudson had applied to the Indian Government for a loan to help the indigo planters to reintroduce the cultivation of the sugar-cane, as an auxiliary to the production of the dye-stuff. The Government of India thereupon appointed Mr. O'Connor, head of the Statistical Department, to report on the proposed scheme of rotating sugar with indigo crops.

Before 1840 sugar was cultivated and manufactured in Behar, but the methods employed were of the crudest, and transport was bad and expensive, therefore the production of sugar gradually died out, and many of the sugar planters turned to the manufacture of indigo. Since 1840 railways and good roads have been introduced. By careful selection and cultivation a better quality of cane-seed is now obtainable. Further, improved modern machinery and methods enable the sugar grower to obtain a much enhanced yield of a good class of sugar. The committee appointed to inquire into the possibility of the cultivation of sugar by indigo planters have nearly finished their work, and it is understood they are of the opinion that the cultivation should yield a handsome return to the planters in Behar, "if its cultivation, manufacture and distribution are conducted on business principles." I might also add on scientific principles, and let them employ chemists who are able to do more than simply determine the strength of the sugar by means of a saccharometer. It is to be hoped that the indigo planters, if the cultivation of sugar is introduced, will not again settle down into lethargic coma with the idea that all is now well. They may be absolutely certain that any advantage which they obtain will only add to the energy with which the German men of science will attack the problem.

F. MOLLWO PERKIN.

THE ROYAL INDIAN ENGINEERING COLLEGE.

ALL the members of the teaching staff at Coopers Hill must be gratified at the expression of public opinion in support of the cause of the seven gentlemen who have received notice of dismissal. Since our remarks upon the matter were written last week, leaders and letters have appeared in the *Times*, *Daily News* and other newspapers, expressing astonishment at the condition of things which permits distinguished men of

science to be treated with indignity, and demanding that an inquiry shall be made not only into the present case of injustice, but also into the whole system which renders it possible for scientific service to be belittled by the action of an official unable to appreciate its value.

Testimonies to the importance and efficiency of the work done by the scientific staff at Coopers Hill have been given by men whose opinions carry weight with the public as well as in the world of science. As mentioned last week, Lord Kelvin has directed attention to the valuable work done at the College, and has given his great influence to the cause of the teaching staff. Prof. J. A. Ewing, F.R.S., professor of mechanism and applied mechanics in the University of Cambridge, has since come forward to add his testimony to that of Lord Kelvin and others. The following words of Prof. Ewing's are of particular value in enabling people to appreciate the gravity of the case.

"To suggest that the dismissal of men like Prof. McLeod and Prof. Hearson can make for efficiency is preposterous. I know nothing of the finances or of the administration of Coopers Hill, but I do know something of its teachers and of their teaching. I have examined Prof. Hearson's students at Coopers Hill, and have had the advantage of co-operating with him as examiner in the Mechanical Sciences Tripos at Cambridge. The pages of the Royal Society's *Philosophical Transactions* bear witness to his originality as a contributor to engineering science. Those who know, as I do, what fulness of knowledge and what infinite patience he brings to bear upon his teaching are not surprised that he teaches with success. One feels that to praise him is an impertinence, but when he and his colleagues are treated in this incredible fashion those who know their merits should speak out."

So far as personal qualifications are concerned, therefore, the dismissed members of the staff are perfectly competent to perform their duties; and the results obtained prove that the teaching has been done in a most efficient manner. But a much larger question is at issue. A writer, who signs himself "J. P.," in the *Times* substantiates this remark with a statement of personal experience.

"For upwards of a quarter of a century," he says, "Coopers Hill has supplied the Indian Public Works Department, and for more than half that time the Indian Forest Department, with a body of recruits whose efficiency has been the admiration of all those whose position and experience render them competent to judge the question, men with whom I for one (and I am sure that I express the opinion of all the older members of the Public Works Department) feel it an honour to be associated."

If it were worth while, evidence to this effect could be considerably multiplied, but no useful purpose would be served by doing so. Every one who has followed the expressions in the public Press since the letter from Colonel Ottley was published, is convinced of the abilities of the gentlemen who have been dismissed, and the efficiency of the College.

This efficiency has been attained in spite of circumstances tending to discourage the teaching staff. It is nothing short of a scandal that capable men like those giving instruction at Coopers Hill should be controlled as if they were orderly-room clerks or petty assistants in a private school, with a Mr. Squeers as their over-lord. The only reasonable way to carry on the work of an institution for higher education is to let the teaching staff be largely responsible for the arrangement of courses of studies as well as for the actual instruction, but this does not appear to be the method followed at Coopers Hill; for the present deplorable state of affairs could not have arisen if the views of the staff as to the reorganisation of studies had been obtained. "J. P." expresses this view in the following extract from his letter:—

"One of the reasons why it has been so successful is that former presidents have looked upon the college not as a field for the display of their own vanity, or for trying experiments

to prove their own powers of organisation, but as an institution of lofty traditions and high standards, the maintenance of which it has been their study to secure by constant watchfulness and such gradual changes as experience has shown to be necessary, rather than by hasty and sudden departure from the practice of the past. They have also recognised that the power of control vested in them is not one to be hastily and capriciously brought to bear upon every detail of the life of the college; that the members of the teaching staff are their colleagues and friends, men of honour, integrity and experience, whose advice and opinions on matters connected with their work should be sought for with eagerness and listened to with respect, even if they cannot ultimately accept them.

"When an institution has been worked under a particular system with conspicuous success for eight-and-twenty years, and in the twenty-ninth year we find, in place of order, chaos, in place of friendship and *esprit de corps* of the best kind, distrust and recrimination, when half the staff are dismissed with the notice that would be given to a coachman, and the other half are in the dark as to what their future duties are to be, when the students are on the verge of mutiny, and threats of dismissal are daily occurrences—it is not 'the system' which is to blame."

The president of the College apparently rules as an autocrat, and the members of the teaching staff have to do as he directs them, whatever their own opinions as to the scheme of work or value of subjects may be. The Board of Visitors has a conference with the president for an hour or so once a year, and his views or recommendations are naturally adopted. The board does not come into contact with the teaching staff, and the members are, therefore, unable to understand the conditions under which the work of the College is carried on. It is stated, indeed, that the Board of Visitors imagined the revised curriculum submitted to have been considered by the teaching staff, whereas the staff were not consulted.

We notice in the *Times* the statement that the Secretary of State for India has refused to grant the inquiry asked for, but it is to be hoped the matter will not be allowed to rest here. A strong deputation must be organised to present the memorial which we understand has been prepared, begging for an inquiry into the case, and directing attention to the position of the teaching staff in relation to the educational policy of the College. Unless there is a reformation, the case of the members of the staff left will be even worse than that of those who have been ordered to retire in such an inconsiderate way.

Among the signatures already appended to the memorial are those of—Lord Kelvin, Lord Lister, Lord Rayleigh, Sir William Huggins, Sir Frederick Abel, Sir Frederick Bramwell, Sir William Crookes, Sir Archibald Geikie, Sir Norman Lockyer, Sir Andrew Noble, Sir Henry Roscoe, Prof. Armstrong, Mr. W. H. M. Christie, Prof. Dewar, Prof. Ewing, Mr. R. T. Glazebrook, Mr. W. N. Shaw, Prof. J. J. Thomson, Prof. Marshall Ward, and of some seventy other Fellows of the Royal Society. Professors and teachers at all the educational centres in the country are sending in their names and testifying to the widespread indignation at the action of the India Office.

H. W. CHISHOLM.

MR. H. W. CHISHOLM, late Warden of the Standards, Board of Trade, died in his ninety-second year on January 16. He was formerly chief clerk of the office of the Comptroller General of the Exchequer, and on the abolition of that office in 1866 he was appointed to take charge of the old Department of Weights and Measures. In 1867 a new Standards Act was passed, by which all powers and duties of the Treasury and Exchequer were transferred to the Standards Department of the Board of Trade, and Mr. Chisholm was made the chief of the department with a salary of 1000*l.* per annum. In 1868, mainly on Mr. Chisholm's repre-

sentations, a Royal Commission on Standards was appointed, on which he became an active member. The Commission included also the late Prof. W. H. Miller, Sir George Airy and General Sabine, eminent men of science, by whose efforts the Standards Department was raised to a prominent scientific position, furnished with proper standards of length, mass, capacity and cubic measurement, and with instruments essential for verifications for scientific purposes.

Mr. Chisholm held the appointment of Warden of the Standards until 1877, when he retired after fifty-three years of public service. With his retirement the title of Warden of the Standards was dropped, the duties then being undertaken by a superintendent of the Standards Department.

Mr. Chisholm issued an annual report during the ten years he held office, which was always full of information of great interest and public use, and in which metrological researches were dealt with in an exhaustive manner. For instance, amongst the subjects which his printed reports dealt with we find, besides the ordinary work of testing and comparing, standards of measure, &c., investigations as to the expansion of metals, density of water, effects of atmospheric pressure with reference to the measurement of gas, calculation of probable errors of observation in micrometric work, &c.

Mr. Chisholm took a prominent part in the early work of the Bureau international des Poids et Mesures at Paris, which was established under a Metric Convention; and he represented Great Britain at a diplomatic conference at Paris in 1875. In 1877 he published a book relating to the history, &c., of the standards, entitled "Weighing and Measuring" (Macmillan).

With Mr. Chisholm an important link has passed away between the old and the new civil servants, and all who had the pleasure of knowing him well will remember for many years his varied abilities, cheerful disposition, and his desire to help others.

NOTES.

IN consequence of the death of the Queen, all the lectures at the Royal Institution have been abandoned until further notice.

WE have received information from Cairo that the time ball at Port Said is dropped daily at 12 noon (30° meridian time) by direct automatic signal from Abhassia Observatory. Omdurman receives the same signal, and from about the middle of February the time ball at Alexandria will be similarly controlled. Arrangements have been made by which a daily weather telegram at 8 a.m. is exchanged between Alexandria and Malta, Brindisi, Trieste, Athens and Beirut. The information so received is posted outside the port offices at Alexandria and Port Said daily for the use of shipping.

PROF. R. BLANCHARD has resigned his office of general secretary of the Zoological Society of France, after twenty-three years of service. The Society has decided to present him with a medal in commemoration of his work.

WE regret to see in the *Times* the announcement of the deaths of Dr. Danckelmann and M. Gramme. Dr. Danckelmann was director of the Prussian Royal Academy of Forestry at Eberswalde. He rendered great services to the science and art of forestry in Prussia, and was one of the first to advocate effectively the training of foresters in special colleges. He took a leading part in the teaching at Eberswalde and was the author of many interesting works on forestry. M. Gramme will be remembered by his inventions in connection with dynamos and electric batteries. For his dynamo he received 20,000 francs from the French Government and the Volta prize of 20,000 francs from the Academy of Sciences.